CLAIMS:

1. A method of acquiring a three-dimensional image data set of a periodically moving organ (11) of the body of a patient (5) by means of an X-ray device (1) which includes an X-ray source (2) and an X-ray detector (3), a motion signal (H, B) which is related to the periodic motion of the body organ (11) being acquired simultaneously with the acquisition of projection data sets (D_0, D_1, ..., D_{16}), characterized in that the projection data sets (D_0, D_1, ..., D_{16}) required for the formation of the three-dimensional image data set are successively acquired from different X-ray positions (p_0, p_1, ..., p_{16}) which are situated in one plane, that the X-ray device is controlled by means of the motion signal (H, B) in such a manner that a projection data set (D_0, D_1, ..., D_{16}) is acquired during a low-motion phase of the body organ (11) in each X-ray position (p_0, p_1, ..., p_{16}) required for the formation of the three-dimensional image data set, and that the projection data sets (D_0, D_1, ..., D_{16}) acquired during the low-motion phases are used for the formation of the three-dimensional image data set.

2. A method as claimed in claim 1, characterized in that only the projection data sets (D_0, D_1, ..., D_{16}) that have been acquired during the same motion phases (H_1, B_1) are selected and used.

3. A method as claimed in claim 1, characterized in that the various X-ray positions (p_0, p_1, ..., p_{16}) are successively occupied in an X-ray cycle (R_1), that a plurality of X-ray cycles (R_1, R_2) are successively completed, and that the X-ray device (1) is controlled by means of the motion signal (H, B) in such a manner that each X-ray cycle (R_1, R_2) commences in a different phase of motion (H_1, H_2; B_1, B_2, B_3) of the body organ (11).

4. A method as claimed in claim 1, characterized in that the X-ray device (1) is controlled by means of the motion signal (H, B) in such a manner that projection data sets (D_0, D_1, ..., D_{16}) are acquired only during low-motion phases (H_1; B_1, B_3) of the body organ (11).

5. A method as claimed in claim 1, characterized in that the X-ray device (1) is controlled by means of the motion signal (H, B) in such a manner that the X-ray source (2) is switched on so as to acquire projection data sets (D_0, D_1, ..., D_{16}) exclusively during low-motion phases (H_1; B_1, B_3) of the body organ (11).

6. A method as claimed in claim 1, characterized in that a respiratory motion signal (B) which is dependent on the patient's respiration is acquired as a motion signal.

7. A method as claimed in claim 1, characterized in that a cardiac motion signal (H), notably an electrocardiogram, which is dependent on the motion of the heart is acquired as the motion signal.

8. A method as claimed in claim 7, characterized in that in addition to the cardiac motion signal (H) there is acquired a respiratory motion signal (B) which is dependent on the respiratory motion, and that the respiratory motion signal (B) is used to ensure that only the projection data sets (D_0, D_1, ..., D_{16}) that have been acquired during the same respiratory motion phases (B_1) are used to form the three-dimensional image data set.

9. A method as claimed in claim 8, characterized in that the respiratory motion signal (B) is used to correct, during the formation of the three-dimensional image data set, the projection data sets (D_0, D_1, ..., D_{16}) that have been acquired in different respiratory motion phases (B_1, B_2, B_3) and the shifts in position of the body organ (11) resulting therefrom.

10. A method as claimed in claim 6, ~~8 or 9,~~ characterized in that the respiratory motion signal (B) is used to inform the patient (5) that a desired respiratory motion phase (B_1) has been reached during which the acquisition of the projection data sets (D_0, D_1, ..., D_{16}) takes place.

11. A method as claimed in claim 1, characterized in that the motion signal (H, B) is used to control the X-ray device (1) in such a manner that projection data sets (D_0, D_1, ..., D_{16}) are acquired from individual, selected X-ray positions (p_0, p_1, ..., p_{16}).

12. An X-ray device, notably for carrying out the method claimed in claim 1, which includes an X-ray source (2) and an X-ray detector (3) for the acquisition of a plurality

of projection data sets (D_0, D_1, ..., D_{16}) from different X-ray positions (p_0, p_1, ..., p_{16}) and for the formation of a three-dimensional image data set of a periodically moving organ (11) of the body of a patient (5) from the projection data sets (D_0, D_1, ..., D_{16}), and also includes means (7, 8, 9, 10) for measuring a motion signal (H, B) which is related to the periodic motion of the body organ (11) and is acquired simultaneously with the acquisition of the projection data sets (D_0, D_1, ..., D_{16}), characterized in that there is provided an arithmetic and control unit (6) for controlling the X-ray device (1) and for forming the three-dimensional image data set in such a manner that the projection data sets (D_0, D_1, ..., D_{16}) required for the formation of the three-dimensional image data set are successively acquired from different X-ray positions (p_0, p_1, ..., p_{16}) which are situated in one plane, that a projection data set (D_0, D_1, ..., D_{16}) is acquired during a low-motion phase of the body organ (11) in each X-ray position (p_0, p_1, ..., p_{16}) required for the formation of the three-dimensional image data set, and that exclusively the projection data sets (D_0, D_1, ..., D_{16}) acquired during the low-motion phases are used for the formation of the three-dimensional image data set.

13. An X-ray device as claimed in claim 12, characterized in that the means (7, 8) for measuring the motion signal are arranged to measure a cardiac motion signal (H) which is dependent on the cardiac motion.

14. An X-ray device as claimed in claim 12, characterized in that the means (7, 8) for measuring the cardiac motion signal (H) include an electrocardiography device or a pulse oxymetry device.

15. An X-ray device as claimed in claim 12, characterized in that the means (9, 10) for measuring the motion signal are arranged to measure a respiratory motion signal (B) which is dependent on the respiratory motion.

16. An X-ray device as claimed in claim 15, characterized in that there is provided a signaling device (12) for informing the patient that a desired respiratory motion phase (B_1) has been reached.

17. An X-ray device as claimed in claim 15, characterized in that the means (9, 10) for measuring the respiratory motion signal (B) include an ultrasound device, an

abdominal belt for measuring the motion of the diaphragm, or a resistance measuring device for measuring the resistance of the abdominal region of the patient (5).